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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/511,492
Filing Date: October 15, 2004
Appellant(s): MUTH, MATTHIAS

Robert J. Crawford, Reg. No. 32,122
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 15, 2010 appealing from the Office action mailed October 22, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,793,189	Kawaguchi	8-1998

Applicants' admitted prior art; Background of the Specification, page 1, lines 7-19.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art ("APA", specification, page 1) in view of Kawaguchi (US 5,793,189).

With respect to claim 1, APA discloses a circuit arrangement for a vehicle for generating at least two DC output voltages from at least one DC input voltage, wherein the DC output voltages are smaller than the DC input voltage, the circuit arrangement comprising: a voltage regulator for generating the DC output voltages to supply power to a set o circuit elements used for operating the vehicle from a voltage regulator input; a DC/DC converter for converting the DC input voltage to a lower voltage (page 1, lines 7-19). APA states that it is known from the state of the art to arrange a DC/DC converter preceding "such circuit arrangements." The circuit arrangements refers to page 1, lines 3-4, where APA states that voltage regulators are provided to generate Dc output voltages (plural).

APA does not expressly disclose the DC/DC converter can be switched on and off or that the logic circuit is powered by the DC input voltage.

Kawaguchi discloses a circuit arrangement for a vehicle (fig 1; col. 5-6) comprising a DC/DC converter (6) for converting the DC input voltage to a lower voltage (col. 5, lines 45-55), and a logic circuit (col. 5, lines 38-44) configured to provide the on-off signal to the DC/DC converter in response to an idle state in which the circuit elements are switched off (col. 7, line 57 to col. 8, line34), wherein the logic circuit is configured to receive the DC input voltage (via diode 18; col. 6, lines 57-65) to power the logic circuitry when the DC/DC converter is switched off. The Kawaguchi logic circuit recognizes the level of input voltage (which is based in part on the status of the loads) and turns the converter on/off accordingly.

The claim does not indicate if the converter is turned on or turned of when the idle state is detected. The broad limitation of providing an "on/off signal to the DC/DC converter in response to an idle state" is met by the Kawaguchi logic (ST input terminal).

APA and Kawaguchi are analogous because they are from the same field of endeavor, namely vehicle power distribution systems. At the time of the invention by applicant, it would have been obvious to one skilled in the art to combine the converter and regulator arrangement disclosed in APA with logic circuit on/off control and power input disclosed in Kawaguchi in order to reduce power consumption in the vehicle by turning off the converter when it is not needed (Kawaguchi, col. 12, lines 20-38).

With respect to claim 2, Kawaguchi discloses that the DC input voltage is used for energy supply of the arrangement (abstract).

With respect to claims 3-4, it would have been obvious to one skilled in the art to arrange any of the APA or Kawaguchi components on an integrated circuit, since it has

been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893). Placing components on an integrated circuit, as opposed to separate circuit boards, does not appear to affect their overall performance. Placing the components in one location is an aesthetic design choice in order to minimize space and clutter.

With respect to claim 5, APA and Kawaguchi combine to disclose the recited integrated circuit, as discussed above in the rejections of claims 1 and 4.

With respect to claim 6, Tamai disclose the DC input voltage has a value of approximately 42 volts (col. 4, lines 48-53) and the voltage supplied by the DC/DC converter has a value of approximately 12 volts (col. 4, lines 54-59). Further, it would be obvious to one skilled in the art to select any suitable input/output voltages for the DC/DC converter based on the end use of the device, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claims 7 and 14, Kawaguchi discloses that the logic circuit (ST node) is powered by the DC input voltage, as discussed above. The Kawaguchi logic circuit controls the on/off operation of the converter, but is never powered by the converter (voltage output node is VRO).

With respect to claims 8, 12 and 15, APA discloses that it is known in the art to configure the output voltages to be smaller than the lower voltage (the DC/DC converter output)(page 1, lines 1-4).

With respect to claims 9 and 16, Kawaguchi discloses a power supply (items 2, 10, 11, 16) configured to supply the DC input voltage. Kawaguchi discloses a battery (2) that is part of the power supply. As discussed in the rejection of claim 1, Kawaguchi was only relied upon to meet the limitations associated with the logic circuit (on/off operation and power input). Looking at Kawaguchi's figure 1, none of the components to the right (output side) of the converter (6) are relied upon the art rejection of the claims. APA discloses that the converter is coupled to a voltage regulator without the use of a battery. Thus, APA and Kawaguchi combine to disclose only one battery (Kawaguchi, item 2) which is part of the power supply.

With respect to claim 10, APA and Kawaguchi disclose the recited limitations, as discussed above in the rejections of claim 7 and 9.

With respect to claim 11, APA (page 1, lines 7-19) and Kawaguchi (col. 5, lines 45-55) disclose the DC/DC converter provides a lower voltage at the output, as discussed above in the rejection of claim 1.

With respect to claim 13, APA and Kawaguchi combine to disclose the recited limitations of a circuit arrangement, as discussed above in the rejection of claim 1. Claim 13 contains limitations identical to those presented in claim 1, except that claim 13 does not recite that the control circuitry is powered when the DC/DC converter is switched off. The references are analogous, as discussed above.

With respect to claim 17, Kawaguchi discloses the DC/DC converter turns on and off in response to the state of the circuit elements (col. 7, line 57 to col. 8, line 34), as discussed above in the rejection of claim 1.

(10) Response to Argument

Appellants present three arguments in the appeal brief, all of which concern the last paragraph of claim 1 (lines 10-13). Appellants do not challenge the assertion that appellants' admitted prior art ("APA") discloses the claimed configuration of converter and regulators and do not challenge the combination of references.

Appellants' first argument (Brief, beginning at the middle of page 4) concerns the limitation of "the logic circuit further configured to receive the DC input voltage to power the logic circuitry." In the heading of the argument (bold title under section VII, subheading A), appellants phrase the argument as, "the cited references fail to disclose a logic circuit that is powered by the same DC input voltage that DC/DC converter converts to a lower voltage" (emphasis added). Claim 1 uses the phrase, "configured to receive the DC input voltage." There is no requirement in the claim that the voltage actually received by the logic circuit is the same as the DC input voltage that is supplied to the DC/DC converter.

Appellants argue that the voltage marked V_J (Kawaguchi, figure 1) is not the same as V_K. The Examiner submits that the voltage regulator (17) causes a difference in voltage potential so that V_J and V_K are not exactly equal (Brief, page 5, lines 9-11). The amount of regulation caused by item 17, however, is not disclosed in the reference.

Regardless of the function of regulator (17), appellants' argument improperly equates the phrase "configured to receive" with "the same as." The phrase, "configured to receive" only means that the claimed logic circuitry can operate with the DC input voltage, or that the logic circuitry is capable of receiving the DC input voltage. The

phrase, "configured to receive" does not require that the DC input voltage is actually used to power the logic circuitry. The mere possibility of a circuit to receive a voltage does not require that it receive that voltage.

Kawaguchi discloses that the logic terminal (ST terminal of converter 6) can receive 12 volts from the battery (col. 6, lines 24-27). The 12 volts is a relative HIGH signal to distinguish from a LOW signal that is used to indicate when the logic should turn off. As discussed above, Kawaguchi is silent as to the level of regulation in item 17; therefore, we do not know the voltage level provided to the ST terminal via diode 18. And Kawaguchi does not disclose an upper limit to the voltage acceptable at the ST terminal or any other voltage that would cause the circuit to fail. One skilled in the art would recognize that the ST terminal is "configured to receive" the DC input voltage (HVI input of converter 6), which is disclosed as ranging from 40-60 volts (col. 5, lines 45-62). The voltage presented to the ST terminal can be as high as 40 volts, because the voltage only needs to be distinguished from the LOW signal (zero volts) in order to accomplish its function.

Additionally, Kawaguchi shows that the logic circuit (ST) receives the DC input voltage via a regulator (17) and a diode (18), collectively labeled as a charge I/F circuit (11). The charge I/F circuit (11) is the circuitry that "configures" the Kawaguchi logic circuit (ST) to receive the DC input voltage.

Alternatively, Kawaguchi's figure 5 shows an embodiment of the internal configuration of the DC/DC converter (fig 1, item 6; fig 5, item 63) and logic circuit (fig 1, item ST; fig 5, item 61; col. 8, lines 54-61). As can be seen by the figure, the DC input

voltage (HVI) branches into two components (about 2 inches to the right of the HVI label); one component is passed to the DC/DC converter input (at transformer T21), the second component is used to power the logic circuitry (via transistor Q7). Thus, Kawaguchi expressly discloses an embodiment in which logic circuit is "configured to receive" the DC input voltage to power the logic circuitry.

Appellants argue that "the Examiner's assertion fails to address the actual claim limitations which require that the voltage that powers the logic circuit be the same as the voltage that the DC/DC converter converts to a lower voltage" (Brief, page 5, lines 23-24). As discussed above, the claim limitations do not require that the voltages be "the same." So long as Kawaguchi shows that the logic "can", "is capable", or "is configured to" receive the DC input voltage, the reference meets the recited limitations.

Appellants' second argument (Brief, top of page 6) concerns the limitation of "the logic circuit configured to receive the DC input voltage to power the logic circuit when the DC/DC converter is off" (emphasis added). Kawaguchi explicitly discloses that the logic circuitry can turn the DC/DC converter on and off (col. 5, lines 38-44; col. 6, lines 24-27, 57-65; col. 7, lines 56-62; col. 8, lines 10-12, 20-34). Kawaguchi discloses that the converter starts DC-DC conversion when a specified voltage is supplied to the starting control input terminal ST (col. 5, lines 38-44). Thus, the reference meets the limitation that the logic circuit receives power when the converter is off. The logic circuit can turn the converter on, because the logic circuit is already on (i.e. receiving power).

Appellants contend that since the Kawaguchi apparatus discloses a removable charging plug (fig 1, item 10; col. 6, lines 40-50), that there are two mutually exclusive

embodiments (Brief, page 6, lines 4-6). To support the assertion of two mutually exclusive embodiments, appellants do not provide any citation to the Kawaguchi reference, and only broadly point to page 4 of the Final Office Action. Kawaguchi discloses a vehicle-based power supply with a charging plug. It would be obvious to one skilled in the art that, during normal operations of the vehicle, the vehicle would be charged via the plug and that the plug is removed when the vehicle is to be driven.

It appears that appellants are basing this argument on the interpretation that V_K is used to power the logic circuit, and that V_K is only available when the charger is plugged in. Claim 1 recites that the logic circuit is "configured to receive" the DC input voltage. There is no requirement in the claim that the logic circuit always receives the DC input voltage. Even when the charging plug is removed, and V_K is not provided to the logic circuit (ST), the logic circuit is still "configured to receive" the DC input voltage.

Appellants contend that "there is no situation in which the input terminal ST of the '189 reference receives the voltage VK and the DC/DC converter 6 is switched off" (Brief, page 6, last 3 lines). It would be obvious to one skilled in the art that the Kawaguchi vehicle is not always charging. The vehicle is designed to be driven (i.e. charging plug is removed). Kawaguchi discloses that during "the operation of the vehicle", when the main switch is turned on, a sufficient voltage is supplied to the logic circuit to turn the DC/DC converter on (col. 7, lines 56-62).

Appellants contend that using and removing the Kawaguchi plug represents two mutually exclusive embodiments of the vehicle is incorrect. As shown above, the

Kawaguchi logic can turn the DC/DC converter on, which means that the logic is on (i.e. receives power) when the DC/DC converter is off.

Appellants' third argument (Brief, beginning on page 7 at subheading C) concerns the limitation of "the logic circuit configured to provide an on-off signal to a DC/DC converter in response to an idle state." Again, appellants improperly characterize the use of the Kawaguchi charging plug as two mutually exclusive embodiments. For the purpose of brevity, the counter-argument to this assertion is not repeated here.

Kawaguchi discloses that if the main ignition switch (9) is off, but the headlights are left on, the main battery voltage will discharge (col. 8, lines 20-34). It is noted that appellants have not challenged the interpretation that the Kawaguchi headlights are "circuit elements used for operation of the vehicle." Kawaguchi discloses that if the headlights are left on, the voltage of the main battery will decrease to a dangerous low level and the DC/DC converter is turned off to protect the battery. Thus, Kawaguchi discloses that the logic circuit is configured to provide the off signal to the DC/DC converter in response to a non-idle state (when the circuit elements are switched on).

Conversely, if the headlights were not left on (i.e. they are switched off), then the battery voltage will not decrease and the DC/DC converter will be controlled to be on. Kawaguchi discloses one situation on which the DC/DC converter is turned off in response to the state of the circuit elements (headlights on). If the Kawaguchi provides the off signal to the DC/DC converter when the headlights are left on, then it would be

obvious that Kawaguchi provides the on signal to the DC/DC converter when the headlights are turned off.

The language of the claim is written in broad terminology. Claim 1 recites that the logic circuit provides "the on-off signal" to the DC/DC converter "in response" to a state in which the circuit elements are switched off. The claim does not define "in response" which means that there is no indication in the claim regarding if the DC/DC converter is turned on if the idle state exists or turned off if the idle state exists.

Kawaguchi discloses that the logic provides the off signal when the idle state does not exist. Therefore, it would be obvious that the Kawaguchi logic provides the on signal when the idle state exists. The broad language of the claim does not overcome the teachings of the Kawaguchi reference. The claim does not indicate which signal (on or off) is provided to the DC/DC converter in response to the state of the circuit elements.

Appellants contend that Kawaguchi is deficient because the on-off signal provided by the logic circuit is in response to the battery voltage level (Brief, page 8, lines 1-14). As discussed above, the state of the headlights can be detected by observing the voltage level of the battery. When the headlights are left on after the engine is turned off, the battery voltage will discharge (until the logic circuit turns off the converter to prevent an over-discharge). This function meets the broad limitation of "in response" to an idle state. The claim does not require that the circuit elements are directly monitored.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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